MMC120

Two Axis Linear Motion Control Module

The MMC120 is a high performance motion control module compatible with the Modicon® TSX Quantum Automation Series™ Programmable Controllers. The module provides an effective way to control the position of two axes. The MMC120 senses position using magnetostrictive displacement transducers and controls the associated output based on programmable parameters.

Features

- ModConnect® Certified
- Quantum compatible
- Two axes of control
- Isolated inputs and outputs
- RS-232 diagnostic port for tuning parameters and graphic display of motion
- Direct connection to Magnetostrictive Transducers and proportional/servo valves
- Motion profiles can be changed on the fly
- Full PID loop control
- Velocity and Acceleration Feed-Forward terms
- One millisecond control loop
- FLASH memory for parameter storage

Applications

- Forest Industry machinery
- Pinch roller positioning
- Hydraulic actuators
- Palletizers/Stackers
- Laser positioning
- Tube forging machines

Magnetostrictive Inputs

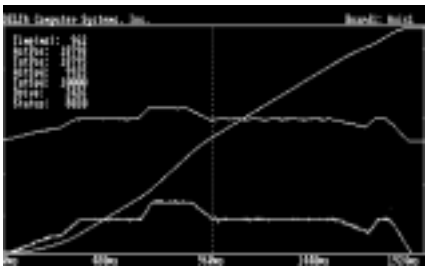
- Resolution to 0.001 inches
- Direct connection to Start/Stop and Gated magnetostrictive transducers
- 1 circulation at 120 MHz
- Differential line receiver or single-ended inputs
- Maximum speeds up to 200 inches per second (0.004" resolution)
- Transducer lengths up to 240 inches (0.004" resolution)
- 2500 VAC isolation

Drive Outputs

- ±10 volts
- 1 millisecond update
- 2500 VAC isolation
- Current output available with optional VC2100 module

Tuning/Diagnostics Program

- DCS120 provides a graphic display of latest motion profile position and drive information



- Calculates Scale & Offset parameters
- Provides access to auto tuning function
- Allows activation of simple motion profiles from a PC
- Permits user to change control parameters from a keyboard
- Displays parameter and status information for both axes
- Saves and retrieves graphic diagnostic information

Event Control

- Designed for time-critical applications
- Repeatable 1 millisecond execution of motion commands
- Provides easy, spreadsheet-style programming
- Responds to time delays, status bit conditions, or positions
- 256 event steps

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Hardware Information

RS-232 Diagnostic Port	Interface with Delta's DCS120 setup and diagnostic software	Requires external IBM PC or compatible. Uses standard Modicon RS-232 controller cable.
Magnetostrictive Interface	Interface type	Start/Stop digital pulses or Gated Differential or single-ended
	Input isolation	2500 VAC optical isolation
	Recirculations	1 (provides resolution of 0.001 inch)
	Counters	120 MHz count rate
	Position update time	One millisecond
Drive Outputs	Type	±10 volts (VC2100 current option available)
	Resolution	12 bits
	Output isolation	2500 VAC optical isolation
Quantum Bus Interface	Quantum I/O requirements	I/O mapped as an **MMC 120 0X** using four input and four output registers in binary format. Requires 64 input and 64 output points per module.
	Register requirements	16 consecutive registers per axis plus optional motion profiles. Up to eight motion profiles can be specified. Each profile requires four registers. A total of 64 registers are required if both axes and all eight profiles are used.
Power Requirements	Backplane	+ 5 VDC @ 1 A maximum
Mechanical Specifications	Dimensions (WxHxD)	1.59 x 9.84 x 4.09 in (40.34 x 250 x 103.85 mm)
	Weight	1 lb. (0.5 kg) max
	Connectors:	
	Backplane	Direct plug-in to Quantum rack
	Serial port	DB-9S for RS-232 diagnostic port
	Sensor	9 position plug-in terminal block
	Drive	3 position plug-in terminal block
Environment	Operating temperature	+32 to +140 F (0 to +60C)
	Non-operating temperature	-40 to +185 F (-40 to +85C), per IEC 68-2-14, test Nb
	Storage temperature	-40 to +185 F (-40 to +85C), per IEC 68-2-1/2, test Nb
	Humidity	0 to 93% non-condensing, per IEC 68-2-3, test Ca
	Shock resistance	30 G for 11 ms, per IEC 68-2-27, Test Ea
	Vibration resistance	1 G at 3 to 500 Hz for 23 minutes per plane, 1 octave/minute in all three planes, per IEC 68-2-6, Test Fc
	ESD immunity	8 kV to all user-accessible surfaces, per IEC 801-2 level tests
	Magnetic immunity	Per IEC 801-3, Level 3
	Agency compliance	UL, CSA, CE

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Programming Parameters

Axis Setup Parameters	Configuration	Module operating configuration
	Scale	Measured position conversion number
	Offset	Fixed position offset
	Extend Limit	Maximum position allowed
	Retract Limit	Minimum position allowed
	Proportional Gain	Proportional gain for PID loop
	Integral Gain	Integral gain for PID loop
	Differential Gain	Differential gain for PID loop
	Extend Vel. Feed Forward	Velocity Feed Forward for extend direction
	Retract Vel. Feed Forward	Velocity Feed Forward for retract direction
	Extend Accel. Feed Fwd	Acceleration Feed Forward for extend direction
	Retract Accel. Feed Fwd	Acceleration Feed Forward for retract direction
	Dead Band Eliminator	Valve dead band compensation
	In Position	Position set point for status bit
	Following Error	Window for following error indication
	Automatic Stop Enable	Enable for stop on errors
Axis Dynamic Control Parameters	Mode	Function selection bits Bit 01: Graph disable Bits 02-09: Not used Bit 10: Sync Bit 11: Quick Mode Bit 12: Unwind Integrator Bits 13 and 14: Integrator mode Bits 15 and 16: Acceleration mode
	Acceleration	Acceleration rate, distance, or time
	Deceleration	Deceleration rate, distance, or time
	Speed	Maximum speed during a move
	Command Value	Destination position in position units
	Command	Command to be executed (F, G, H, O, P, R, S) F (70) Auto adjustment of Feed Forward G (71) Move axis H (72) Halt axis O (79) Open loop output P (80) Initialize axis setup parameters R (82) Restore previously saved drive null S (83) Save current drive null (Refer to manual for additional commands)
Axis Status Information (Read only)	Command Position	Requested position with limits checked
	Target Position	Calculated desired position of axis
	Actual Position	Measured position based on current Transducer Counts that have been Scaled and Offset
	Transducer Counts	Raw transducer counts
	Status Word	Axis errors and status
	Actual Speed	Calculated speed
	Drive	Output drive in millivolts
	Null Drive	Current value for null drive

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Wiring Information

Magnetostrictive Displacement Transducer:

Pin	Function
1	Axis 1 + Interrogation
2	Axis 1 - Interrogation
3	Axis 1 + Return
4	Axis 1 - Return
5	Transducer Common
6	Axis 2 + Interrogation
7	Axis 2 - Interrogation
8	Axis 2 + Return
9	Axis 2 - Return

Drive Outputs:

Pin	Function
1	Axis 1 Drive
2	Drive Common
3	Axis 2 Drive

Serial Port:

Pin	Function
2	Receive
3	Transmit
5	Common
Shell	Shield

Ordering Information

Part Number: MMC 120 00 - Provided with each MMC120: manual, plug-in terminal blocks, DCS120 tuning/diagnostic program, and example ladder program.

Options and Accessories

Part Number	Description
VC2100	Voltage to current converter
PPS/14	Position/Pressure Simulator
SSS/10	Servo System Simulator
AMP/10	1 axis RS-422 converter

Company Profile

Delta Computer Systems, Inc. manufactures motion controllers, color sensors/sorters, and other industrial controls providing high performance automation solutions to a wide range of industries.

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